

the universe, altogether distinct and of another order from the group of cosmical bodies to which our Sun and the fixed stars belong;”* and that: “We have in these objects to do no longer with a special modification only of our own type of Suns, but find ourselves in the presence of objects possessing a peculiar and distinct plan of structure.”† I shall take a subsequent opportunity of showing how untenable is the view he now communicates, that, although the nebulae represent early evolutionary forms, they are at a high temperature and that the constituents of the mass are arranged in the order of their vapour densities. I refrain from discussing these points on the present occasion; but I may remark that if such a view were true, and we further accept the statements that the nebula line was seen in the comets of 1866–67 and that Nova Cygni probably exists as a planetary nebula of small angular diameter, we are driven to the conclusion that comets reduce their temperature as they approach the Sun, and that “new stars” get hotter as their luminosity diminishes.

“Note on the Spectrum of the Nebula of Orion.” By J. NORMAN LOCKYER, F.R.S. Received and read February 13, 1890.

In a former communication I gave in detail observations made by means of a siderostat, which seemed to put beyond all reasonable doubt the question of the origin and true wave-length of the chief nebula line. Although, as I stated in the communication referred to, I regard this question as one of secondary importance, I have commenced another series of investigations with a view of eliminating all possible instrumental errors. The new method has not been completely carried out, but a sufficient approximation to it has been reached to render the results obtained of some interest.

Using the siderostat, object-glass, and collimator as before described, the method in question consists in using a vacuum tube, giving the lines both of hydrogen and nitrogen in front of the slit of the collimator. The tube made for this purpose was found to have leaked when there was an opportunity of using it, so that the observations of hydrogen and nitrogen, in comparison with the nebula lines, have not been made in the same field of view at the same time. The hydrogen tube and an air spark with iron poles (iron poles being chosen in order to check the position of the nebula line near $\lambda 495$) were, however, placed alternately in front of the slit of the collimator, and this enabled the observations to be made with almost equal accuracy. I give the following extract from the Observatory

* ‘Roy. Soc. Proc.,’ vol. 14, p. 42.

† ‘Phil. Trans.,’ 1864, p. 442.

note-book. The observations were made by Mr. Fowler (who was assisted by Mr. Coppen) on February 5:—

“Made further observations of the nebula of Orion with 4-prism Steinheil spectroscope. First compared nebula spectrum with spectrum of spark between iron poles close to slit, the secondary collimator not being used at all.

“*Results.*—495 nebula line exactly coincident with iron line 4956·8. At the same time, the 500 nebula line was certainly less refrangible than the nitrogen lines.

“Next adjusted collimator and put hydrogen tube and iron spark successively in front of slit.

“*Results.*—3rd nebula line coincident with F line of hydrogen.

“495 line coincident with iron 4956·8.

“500 line less refrangible than nitrogen lines.

“500 line exactly coincident with magnesium fluting, whether the magnesium was burned behind the slit of collimator or at the centre of siderostat mirror.”

It will be seen that these observations entirely confirm those which I have already communicated to the Society, and also carry the work a step further in the determination of the actual wave-length of the nebula line near $\lambda 495$ by the siderostat and collimator method.

“Preliminary Note on Photographs of the Spectrum of the Nebula in Orion.” By J. NORMAN LOCKYER, F.R.S. Received and read February 13, 1890.

In other communications to the Society, I have shown that the chief nebula line coincides absolutely in position with the remnant of the fluting seen in the flame of burning magnesium near $\lambda 500$, with the highest dispersion we could command at South Kensington. Attempts have recently been made, therefore, with the 30-inch reflector at Westgate-on-Sea, to obtain photographs of the spectrum of the nebula, using magnesium as the term of comparison. The objects sought were, primarily, to determine whether there was a line in the nebula corresponding with one of the lines of the magnesium triplet about $\lambda 373$, and to obtain as complete a photographic record as possible of the spectrum between this triplet and $\lambda 500$. With this view, Mawson's instantaneous plates were used, these having been found to be fairly sensitive to the green. The exposures have been carried up to four hours, and five photographs have already been taken, some of them with shorter exposures than that named, in consequence of the sky becoming clouded or irregularities in the driving clock, which is not yet completely finished. One plate only was exposed for four hours, on February 11, but, unfortunately, in